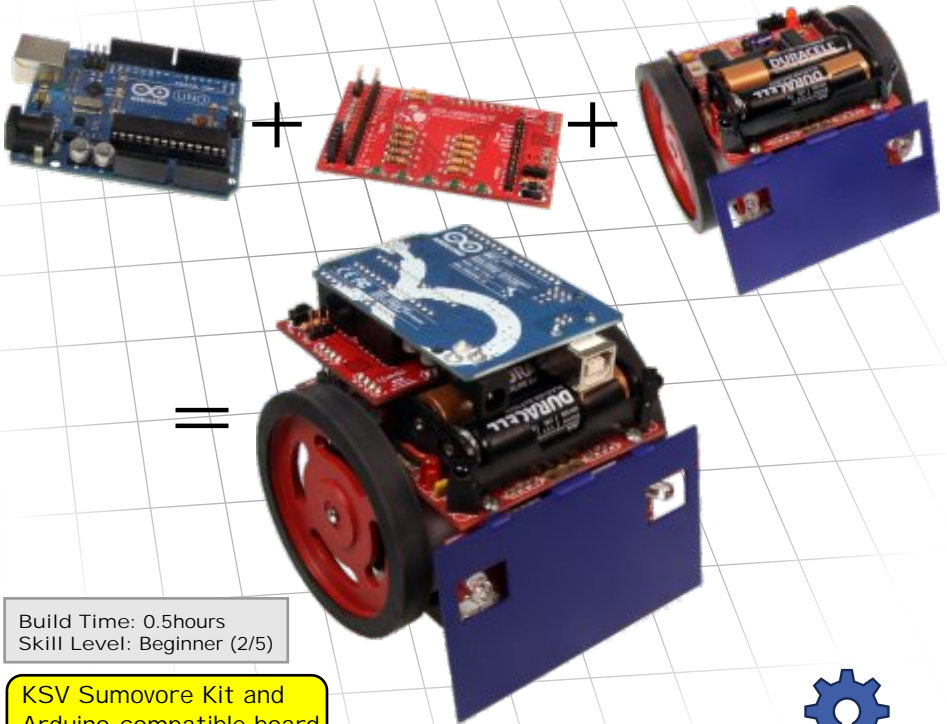


SumoShield Sumovore Arduino® Interface

Interface your Arduino-compatible to your Sumovore!



Build Time: 0.5hours
Skill Level: Beginner (2/5)

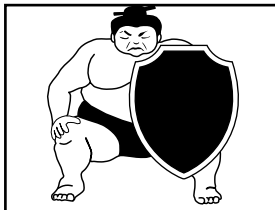
KSV Sumovore Kit and
Arduino-compatible board
NOT included



open hardware

It's time to give your Arduino-compatible *some wheels!*

We've taken the tried-and-proven Sumovore Sumo robot, and created an interface board for any standard Arduino-compatible development board. Like with any of our brainboards, you take full control of your Sumovore from the standard brain and add your own cunning and strategy.



www.solarbotics.com
1-866-276-2687



The Sumovore Arduino SumoShield

What's the deal?

With the popularity of the Arduino development system, there's little point in explaining what it is, other than that it is the defacto go-to platform for quick and easy microcontroller development. So, let's discuss the SumoShield!

As we already have an Atmel-based brainboard, it was a fairly easy task to turn that into the base for an interface for an Arduino. Besides being able to read all the Sumovore's sensors, you have direct control over the motor drive interface and LED indicators, plus having access to an extra digital and analog I/O line (D11 and A5) in a Ground/Voltage/Signal (GVS) configuration (great with 3-pin cables). We've included a convenient communications port breakout, ideal for tapping into the Arduino Tx/Rx lines, and added an easily-accessed Arduino-reset button.

Even with the adapter in place, your Sumovore is still 100% competition legal, fitting within a 100mm cube. Feel free to take it to your next local robot meet!

This adapter lets you swap out the very capable default discrete brainboard for an Arduino-based brain. If you run into any problems, it's a simple process to swap a different brain back in. We've had days when it'd be nice to swap in a new brain, haven't you?

We strongly suggest you inventory the parts in your kit to make sure you have all the parts listed. Use a pen, pencil, pricked finger, chocolate bar - anything to mark off the items. If anything is missing, contact us for replacement parts information.

Disclaimer of Liability

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The Sumovore Arduino SumoShield

Parts List

SumoShield Brainboard Components

- 1 - Printed Circuit Board (PCB)
- 8 - 10k resistors (Brown/Black/Orange)
- 5 - Tiny red LEDs (sensor indicators)
- 5 - 1k Resistors (Brown/Black/Red) (LED resistor)
- 1 - Reset Button
- 1 - QRD1114 edge sensor (for Sumovore's middle sensor)
- 2 - 4-Pin Longer Sumovore interface headers
- 2 - 8-Pin Longer Sumovore interface headers
- 2 - 6-Pin Shorter Arduino interface headers
- 2 - 8-Pin Shorter Arduino interface headers
- 2 - 3-Pin Auxiliary headers (Arduino pins D11 and A5)
- 1 - 4-Pin socket serial communications header

Equipment Required

- Soldering equipment
- Side-cutters or fine snips
- Standard Arduino-Compatible microcontroller platform
- Arduino programming cable/hardware

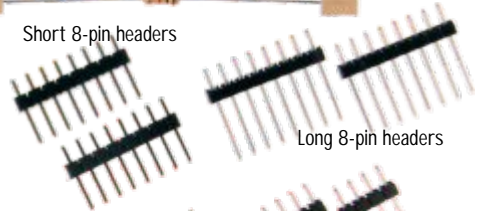
8 x 10k Resistors
(Brown / Black / Orange)



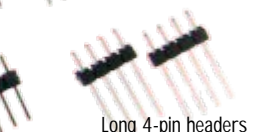
5 x 1k Resistors
(Brown / Black / Red)



Short 8-pin headers



Long 8-pin headers



Long 4-pin headers



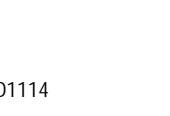
Short 6-pin headers



3-pin headers



4-pin socket header



Reset button



QRD1114



8 x Tiny LEDs



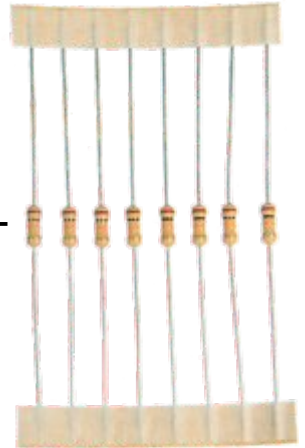
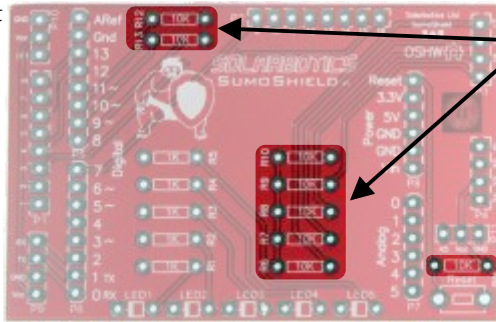
The Sumovore Arduino SumoShield

Building it!

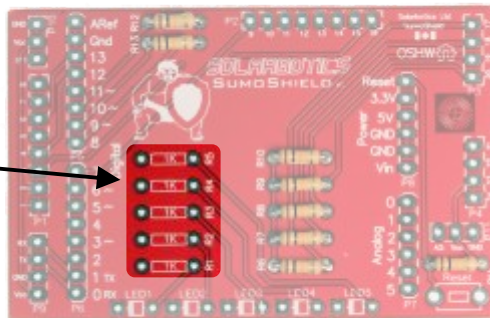
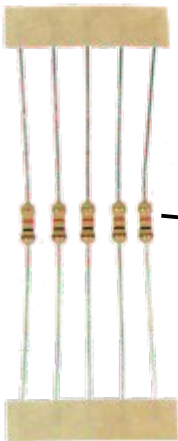
It's an easy build, so let's get started. Just don't mix up which pins go on top versus the bottom (that's a messy fix)

Step 1 - 8 x 10k Resistor (Brown / Black / Orange):
These resistors are signal pull-ups for sensors and signal lines.. Install in positions R6 to R13.

Step 1:
10k resistors
Installed at
R6 to R13



Step 2 - 5 x 1k Resistors (Brown / Black / Red): These 5 resistors are installed in positions R1 to R5. These resistors limit the current going to the tiny indicator LEDs (yet to be installed). And yes, we now realize that it would have made more sense to start documenting this board with R1 to R5, then go do the R6 to R12 in step 1 (sorry!).



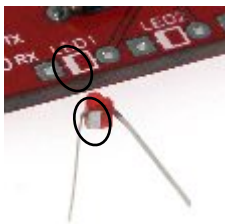
Step 2:
1k resistors (x5)
Install at R1 to R5



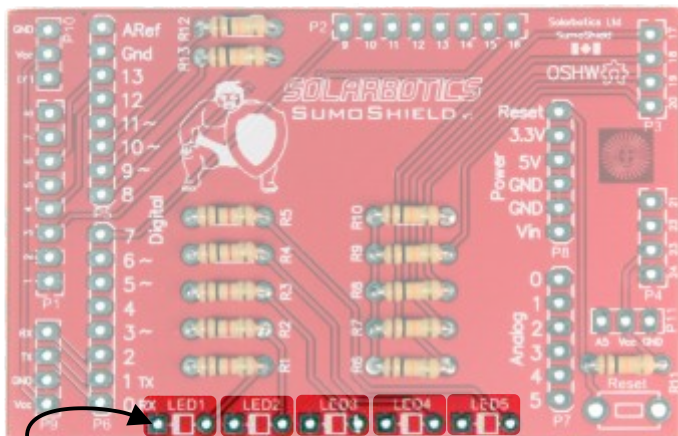
The Sumovore Arduino SumoShield

Building it!

Step 3 - Indicator LEDs: Want to see what's going on? Well, let's get the LEDs installed! Just make sure the stripe on the bottom of the LED matches the stripe on the PCB.



Install so stripes match positions!

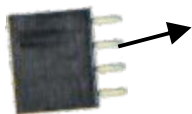


Step 3:
Indicator LEDs to
locations LED1 to LED5
(note stripe position!)

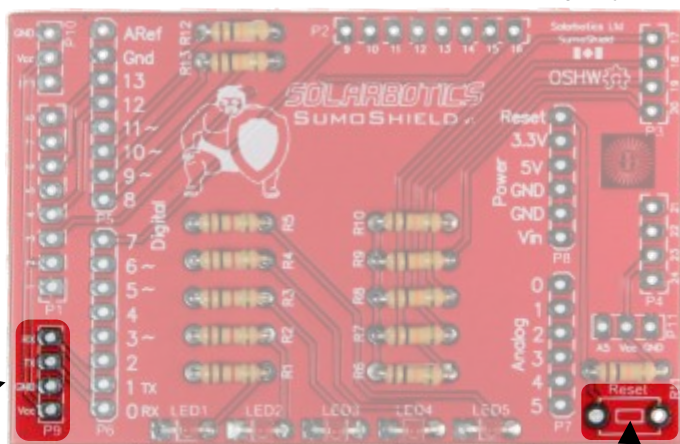


Step 4 - Communications Header: If you think you might use a bluetooth or other communications module, we've left port 'P9' as a convenient plug to jack into the Arduino data lines.

Step 5 - Reset:
It's nice to be able to reset the Arduino from a convenient place!



Step 4:
4-position female
header for future
COM-port use



Step 5:
Reset switch -
for conking your
Arduino over the head!

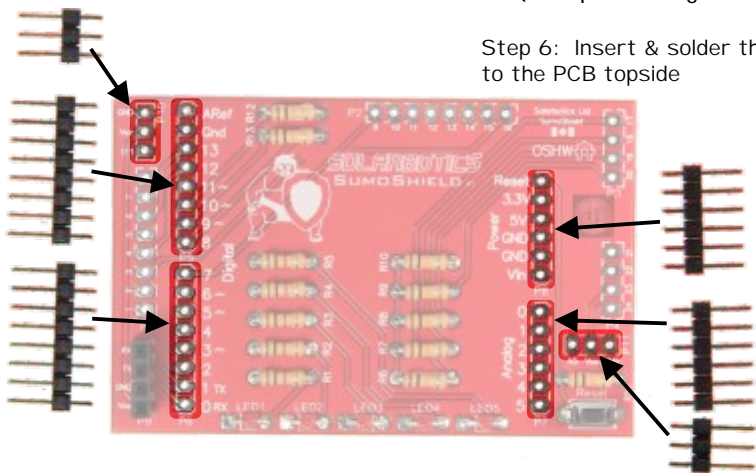




The Sumovore Arduino SumoShield

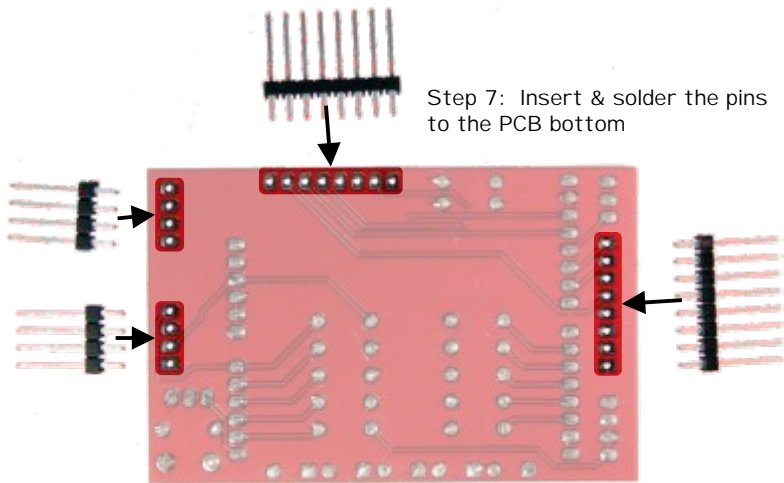
Building it!

Step 6 - Top (Shorter) Pins: Don't mix these shorter pins with the longer ones needed to mate with the Sumovore Mainboard. These interface with the Arduino, and also break-out the extra D11 and A5 lines (with power & ground too).

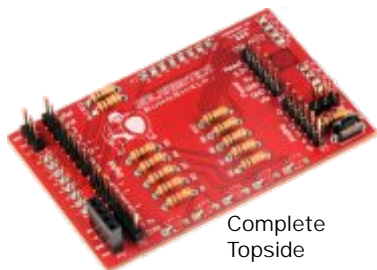


Step 6: Insert & solder the pins to the PCB topside

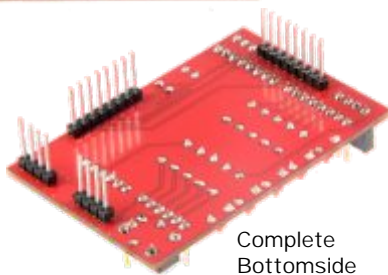
Step 7 - Bottom (Longer) Pins: These longer pins are installed bottom-side, and have the extra reach to mate the adapter board to the Sumovore Mainboard.



Step 7: Insert & solder the pins to the PCB bottom



Complete
Topside



Complete
Bottomside



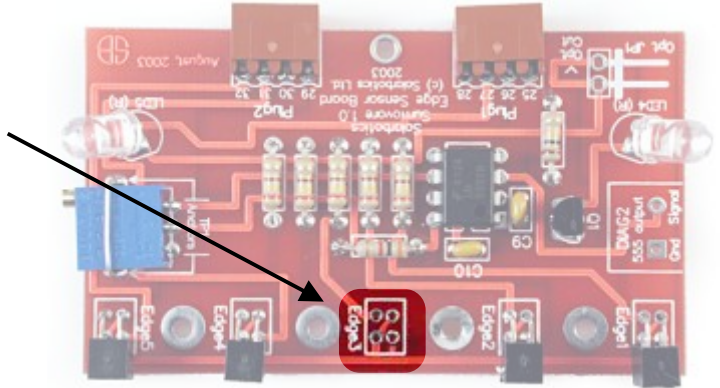
The Sumovore Arduino SumoShield

Building it!

On the Sumovore, you have to add the center edge-sensor to make full use of the Arduino SumoShield:

Step 8 - Installing the 5th line sensor: Yank the edge-sensor board out of your Sumovore, and install the included line sensor in position 'Edge3', just like you did when you originally built your Sumovore.

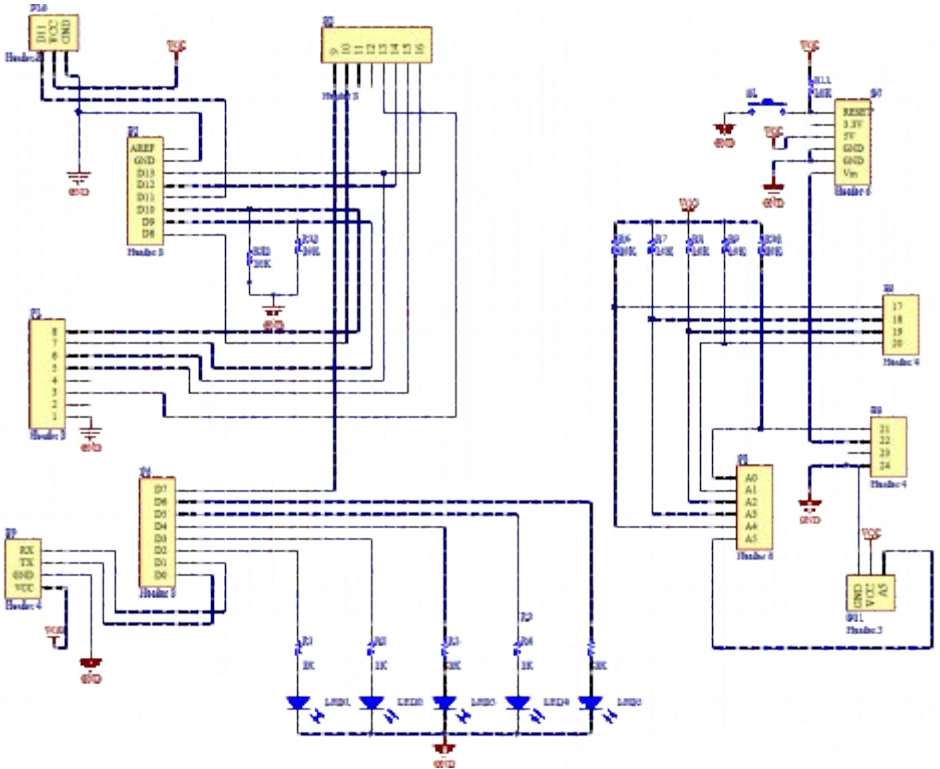
Add the 5th line sensor



Step 9 - Final Assembly: This is a simple matter of prying off the default Sumovore brainboard and replacing it with this SumoShield. Add your standard-Arduino-compatible face down onto the I/O line interface pins, and you're good to go!



So what now? Visit our product page and download our well-annotated sample code to make your Arduino-brained Sumovore act as both an effective Sumo robot, or as a line-follower (all in the same code-base).



Visit us online for more info and cool stuff:

www.solarbotics.com

Solarbotics Ltd.
3740D - 11A Street NE, Suite 101
Calgary, Alberta T2E 6M6
Canada



Toll Free: 1-866-276-2687
International: +1 (403) 232-6268



Fax: +1 (403) 226-3741



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